

SOLUTIONS

Unit 11: Immunity

11.1: The immune system

- B**
In a primary immune response, macrophages present antigens to T-helper cells, which release cytokines. This stimulates the differentiation of lymphocytes, including B-lymphocytes that produce antibodies.
- B**
The electron micrograph shows extensive rough endoplasmic reticulum, indicating that the cell is actively synthesizing a large quantity of proteins, which are often necessary for cell functions like immune responses.
- A**
Mitosis is important in the immune response as it allows B-lymphocytes to proliferate and differentiate into plasma cells, which produce antibodies essential for fighting infections.
- B**
The correct sequence begins with phagocytosis (2), antigen presentation (4), activation of T-helper cells (3), activation of B-cells (1), and finally antibody release (5).
- B**
Activated T-lymphocytes (1) undergo mitosis (5), then T-killer cells bind to antigens on donor kidney cells (3). Finally, T-killer cells release toxins that destroy the donor kidney cells (4), completing the immune response that leads to rejection.
- A**
B-lymphocytes undergo mitosis (1), bind to antigens (2), produce memory cells (3), and secrete antibodies (4) as part of the immune response to pathogens.
- D**
Phagocytes recognize pathogens (2) and secrete enzymes (4) to destroy them. They do not undergo mitosis for memory cell production, which is a function of lymphocytes.
- D**
T-killer cells, unlike macrophages, neutrophils, and generic phagocytes, do not perform phagocytosis (the engulfing and digesting of particles); instead, they are part of the adaptive immune system and kill infected cells by binding to them and inducing apoptosis.
- C**
Phagocytes are immune cells that engulf and digest pathogens and debris. Their mode of action includes:
 1. Receptor binding: Phagocytes have receptors on their surface that can recognize and bind to particles such as bacteria or damaged cells.
 2. Endocytosis: After binding, the phagocyte engulfs the particle in a process called endocytosis, forming a phagosome.
 3. Hydrolysis: The phagosome then fuses with lysosomes, and hydrolytic enzymes break down the engulfed material.
 4. Exocytosis: The digested material is expelled from the cell via exocytosis.
- A**
The primary and secondary immune responses differ in speed and intensity due to the number of specific B-lymphocytes and memory cells available to respond to the antigen.